Claims:

1. A method for compacting a surface (17) of a wooden workpiece (1) such as a solid wooden workpiece or a workpiece manufactured from materials similar to wood such as, for example, from bamboo, from reed or from other wood-based materials such as from plywood, from chipboards and/or from wood-containing paper or paper enriched with resins, characterized in that the surface (17) of the wooden workpiece (1) - while preventing the entry of oxygen - is heated in at least partial areas by supplying energy to the surface (17), which energy supply produces a frictional relative motion on the wooden workpiece (1) and hence a heating and a destruction of the cell structure thereof, and under pressure until a thermoplastic adhesive substance (3) coming from the wooden workpiece (1) is formed, whereupon the surface (17) and a volume area beneath the surface (17) are compacted under application of pressure while being cooled.

2. A method for connecting two wooden workpieces (1, 1′) contacting each other, characterized in that both the contact surface of a first wooden workpiece (1) and the contact surface of a second wooden workpiece (1′) - while preventing the entry of oxygen - are heated in at least partial areas of the surfaces contacting each other by supplying energy to the contact surfaces, which energy supply produces a frictional relative motion between the wooden workpieces (1, 1′) and hence a heating and a destruction of the cell structure of at least one wooden workpiece, and under pressure until a thermoplastic adhesive substance is formed, whereby the two wooden workpieces (1, 1′) are pressed against each other with their contact surfaces under application of pressure, whereupon the contact surfaces of the two wooden workpieces (1, 1′) and volume areas beneath said surfaces are cooled, a surface area of at least one of the wooden workpieces (1, 1′) is compacted under pressure and the wooden workpieces (1, 1′) are welded to one another, with the thermoplastic adhesive substance (3) penetrating under the contact surfaces of the wooden workpieces (1, 1′).

3. A method according to claim 1 or 2, characterized in that the wooden workpiece (1) or the wooden workpieces (1, 1′), respectively, is/are conditioned, during the supply of energy, to a predetermined maximum moisture content and/or to a predetermined minimum temperature and/or to a surface quality such as roughness.

4. A method according to any of claims 1 to 3, characterized in that the wooden workpiece or the wooden workpieces (1, 1′), respectively, is/are conditioned, prior to the energy supply, to a predetermined maximum moisture content and/or to a predetermined minimum temperature and/or to a surface quality such as roughness.

5. A method according to one or several of claims 1 to 4, characterized in that the friction is caused by an oscillating relative motion between the surface of the wooden workpiece (1) and the surface of a counter workpiece (19), in particular in the form of a linearly oscillating relative motion (moving direction roughly parallel to the surface) or in the form of an ultrasonic motion (moving direction at an aribtrary angle), preferably at a right angle to the surface of the wooden workpiece, by a relative motion oscillating vertically to the surface of the wooden workpiece (1).

6. A method according to one or several of claims 1 to 5, characterized in that the relative motion is produced with the aid of ultrasound.

7. A method according to claim 5 or 6, characterized in that a second wooden workpiece (1′) is used as the counter workpiece (19).

8. A method according to claim 5 or 6, characterized in that a counter workpiece (19) comprising a smooth surface with a small wetting angle which prevents adhesion, such as a metallic or mirrored surface, is used.

9. A method according to one or several of claims 1 to 8, characterized in that the degree of the compaction is accomplished depending on properties of the wooden workpiece or wooden workpieces (1, 1′), respectively.

10. A method according to claim 9, characterized in that the degree of the compaction is accomplished depending on the density of the wooden workpiece or wooden workpieces (1, 1′), respectively.

11. A method according to claim 9 or 10, characterized in that the compaction is accomplished depending on a mechanical strength value of the wooden workpiece or wooden workpieces (1, 1′), respectively.

12. A method according to one or several of claims 1 to 11, characterized in that the method is first performed across a partial surface of a wooden workpiece (1, 1′) and subsequently across further partial surfaces of the wooden workpiece (1, 1′).

13. A method according to claim 12, characterized in that the method is performed across the surface of a wooden workpiece (1, 1′) in a continuously progressive manner.

14. A method according to claim 12 or 13, characterized in that the density of the wooden workpiece (1, 1′) is measured continually, preferably in a continuous manner, during the method and the compaction and/or the formation of the thermoplastic adhesive substance (3) is/are effected depending on the measured values.

15. A method according to one or several of claims 1 to 14, characterized in that the compaction is effected by a force which is roughly vertical to the longitudinal axis of the wood fibres of a wooden workpiece (1, 1′), preferably in a radial direction of the tree trunk.

16. A method according to one or several of claims 1 to 17, characterized in that the compaction is performed at an angle deviating from 0° relative to the longitudinal direction of the wood fibres of a wooden workpiece (1, 1′), which deviation is, however, smaller than 90° relative to the longitudinal direction of the wood fibres.

17. A method according to claims 1 to 16, characterized in that, in order to stabilize the dimension of the compaction, a vaporization of the compacted surface and of the welded joint, respectively, of the wooden workpiece or wooden workpieces, respectively (1, 1′), is carried out after the surface compaction or after welding, respectively.

18. A method according to claims 1 to 17, characterized in that the thermoplastic adhesive substance (3) is manufactured in an anaerobic atmosphere.

19. A device for carrying out the method according to one or several of claims 1 to 18, characterized by:

- a workpiece receiver (4) for at least one wooden workpiece (1, 1′),
- a first station comprising an energy-supply means (7) which can be oriented toward a surface of the wooden workpiece (1, 1′),
- a second station comprising a compaction means (8) which can be oriented toward a surface of the wooden workpiece (1, 1′), and
- a third station comprising a cooling means (9) for the wooden workpiece (1, 1′).

20. A device according to claim 19, characterized by a conveyor (10) by means of which a wooden workpiece (1, 1′) can be transported with the workpiece receiver (4) from one station to another.

21. A device according to claim 19 or 20, characterized by a conveyor by means of which individual stations can be transported to a wooden workpiece (1, 1′).

22. A device according to one or several of claims 19 to 21, characterized in that the compaction means (8) is coupled to the cooling means (9).

23. A device according to one or several of claims 19 to 22, characterized in that the energy-supply means (7) and/or the compaction means (8) and/or the cooling means (9) can be brought into direct contact at the surface (17) of the wooden workpiece (1).

24. A device according to one or several of claims 19 to 23, characterized in that the workpiece receiver (4) is provided with a conditioning means (5) for the wooden workpiece (1, 1′) designed as a drying means and/or heating means.

25. A device according to one or several of claims 19 to 24, characterized in that the energy-supply means (7) is designed as a means acting upon a counter workpiece (19), which means produces a frictional relative motion between the counter workpiece (19) and a wooden workpiece (1).

26. A device according to claim 25, characterized in that the frictional relative motion is oriented parallel to the surface (17) of a wooden workpiece (1), which surface is to be treated.

27. A device according to claim 25 or 26, characterized in that the frictional relative motion is oriented roughly vertically to the surface (17) of a wooden workpiece (1), which surface is to be treated.

28. A device according to one or several of claims 19 to 27, characterized in that the counter workpiece (19) has a smooth surface, such as a metallic or mirrored surface, by means of which it can be brought into direct contact with the surface of the wooden workpiece (1).

29. A device according to one or several of claims 25 to 27, characterized in that the counter workpiece is also designed as a wooden workpiece (1′) and both wooden workpieces (1, 1′) can be brought into direct contact with their contact surfaces to be connected.

30. A device according to one or several of claims 19 to 29, characterized in that a

further station comprising a vaporization means for vaporizing a compacted wooden workpiece (1, 1′) is provided.

31. A device according to one or several of claims 19 to 30, characterized by a testing device for nondestructive testing of the treated wooden workpiece (1, 1′).

32. A device according to one or several of claims 19 to 31, characterized in that the device is provided with an enclosure (21) attached to a gas-supply line (22), preferably to a supply means for anaerobic gas, at least in the region of the energy-supply means (7) and preferably also in the region of the compaction means (8).

33. A device according to one or several of claims 20 to 32, characterized in that the conveyor (10) comprises two conveyor belt facilities (11, 12) whose conveyor belts (13) are arranged opposite each other in such a way that at least one wooden workpiece (1, 1′) is insertable by the opposing strands (14) of the conveyor belts (13), which are actuatable in one and the same direction and at one and the same speed, which wooden workpiece (1, 1′) can be conveyed, via the opposing strands (14), to the energy-supply means (7) and further to the compaction means (8) and cooling means (9) as well as to an optionally provided testing device and to an optionally provided vaporization means.

34. A device according to claim 33, characterized in that one of the two conveyor belt facilities (12) comprises two conveyor belts (13, 16) arranged one after the other in the machine direction and actuatable in the same direction, between which a supply means for a further wooden workpiece (1′′) and/or an energy-supply means (7) is/are provided.